

LISTING OF CLAIMS

1. (canceled)

2. (currently amended) A method of claim 1 ~~claim 1~~, wherein said step of modifying a query comprises the steps of prioritizing and filtering the retrieval of related information.

3. (currently amended) A method of claim 2 ~~claim 1~~, wherein said step of modifying a query comprises the steps of augmenting information from the heterogeneous information sources.

4. (currently amended) A method of claim 3 ~~claim 1~~, wherein said step of modifying a query comprises the step of modifying a query to optimize delivery of query results.

5. (currently amended) A method of claim 4 ~~claim 1~~, wherein the heterogeneous information sources are selected from the group consisting of one or more of: people-managed data sources; organization charts; mailing lists; calendar entries; personal address books; priority lists of contacts; and automated system log type information including phone logs and e-mail logs.

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6. (currently amended) A method of claim 1 ~~claim 1~~, further comprising the step of assigning different preferences to the heterogeneous information sources.

7. (currently amended) A method to optimize information retrieval for a user based on the user's communication relationships, comprising the steps of:

automatically extracting and integrating relationship information for said user from multiple heterogeneous information sources;

automatically building and storing a relationship data structure to represent the relationship information; and

automatically modifying an information retrieval query for said user based on the relationship data structure ~~A method of claim 1, further comprising the steps of:~~

wherein said step of building a data structure further ~~comprising~~ comprises the step of tracking communication intensities between each pair of communication entities via each information source; and

integrating the relationship information from the heterogeneous information sources, in response to said tracking step.

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¹⁴
~~8.~~ (original) A method of claim ¹~~7~~, further comprising the step of:

deriving a relation-group for each communication entity based on a pre-specified criterion on said communication intensities.

¹⁵
~~9.~~ (original) A method of claim ¹⁴~~8~~, further comprising the step of:

selecting relation-group entities of a communication entity based on aggregate communication intensities to the communication entity.

E1
¹⁶
~~10.~~ (original) A method of claim ¹⁵~~9~~, further comprising the step of: computing an aggregate communication intensity from an entity A to an entity B based on a weighted sum of the communication intensities from said entity A to said entity B via each information source.

²²
~~11.~~ (currently amended) A method of claim ¹~~10~~, further comprising the steps of:

assigning a weight to each information source based on a preference; and

computing the aggregate communication intensity, based on the weight and the preference.

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¹⁷
~~12.~~ (original) A method of claim ¹⁴~~8~~, further comprising the step of:

deriving relation-group entities of an entity allowing one or more of an indirect relationship and an inferred relationship.

¹⁸
~~13.~~ (original) A method of claim ¹⁷~~12~~, further comprising the step of:

said deriving step further comprising the step of deriving a relation-group of an entity A, which can include the relation-group entities of an entity in the relation-group of the entity A.

E1 ²⁰
~~14.~~ (original) A method of claim ¹⁴~~8~~, further comprising the step of driving an awareness service based on a relation-group relationship.

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~~15.~~ (original) A method of claim ¹~~7~~, further comprising the step of:

building and maintaining additional persistent data structures based on the results of the query to facilitate the response on future queries, based on the relationship data structure.

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16. (original) A method of claim ²³15 wherein the additional persistent data structure can be a personal address/phone book based on the communication intensity.

²⁵
17. (original) A method of claim ¹17, further comprising the step of determining a significance of a relationship between two entities.

²⁶
18. (original) A method of claim ²⁵17, further comprising the step of determining the significance of a relationship based on the aggregate communication intensity.

²⁹
19. (original) A method of claim ¹18, wherein the tracking step can be subject based.

E1
²¹
20. (original) A method of claim ¹⁴19, wherein the relation-group can be subject based.

²⁷
21. (original) A method of claim ²⁶20, wherein the significance of the relationship can be subject based.

²⁸
22. (original) The method of claim ²⁶21, further comprising the step of downloading information based on the significance of the relationship.

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~~5~~ 23. (original) The method of claim ~~3~~ ⁴, further comprising the step of resolving name ambiguity by using the relationship from the heterogeneous information sources to determine one or more of an e-mail address, phone number, and a full name.

~~11~~ 24. (original) The method of claim ~~4~~ ¹⁰, further comprising the step of recommending a communication channel based on a recipient characteristic.

~~30~~ 25. (original) The method of claim ~~1~~ ¹, further comprising the step of caching a document and information based on the significance of the relationship.

E1 ~~31~~ 26. (currently amended) A method of claim 1 ~~claim 1~~, further comprising the step of detecting inconsistency among data in the heterogeneous information sources.

~~32~~ 27. (original) The method of claim ~~26~~ ³¹, further comprising the step of detecting changes in the relationship information maintained.

~~33~~ 28. (original) The method of claim ~~27~~ ³², further comprising the step of propagating the changes.

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³⁴
~~29~~. (original) The method of claim ~~27~~³², further comprising the step of alerting the changes.

³⁵
~~30~~. (currently amended) A method of claim 1 ~~claim 1~~, further comprising the steps of:

integrating the relationship information from the multiple heterogeneous sources using a graph wherein each node represents a communication entity, and a link between a pair of nodes represents the existence of a communication relationship between the two nodes.

³⁶
~~31~~. (original) A method of claim ~~30~~³⁵, further comprising the step of labeling each link with a communication intensity vector, where each dimension of the communication intensity vector represents a communication intensity from an information source.

E | ¹⁹
~~32~~. (original) A method of claim ~~31~~¹⁷, further comprising the step of calculating aggregate communication intensities taking into account the indirect relationship.

⁹
~~33~~ ~~32~~. (currently amended) A method of claim ~~32~~⁴, further comprising the step of obtaining relevant information from the heterogeneous information sources, said information selected from the group consisting of one or more of: phone numbers; e-mail

addresses: mailing addresses; office location; department; or manager, from various information sources.

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~~34.~~ (original) A method of claim ~~7~~¹, further comprising the step of calculating a communication intensity based on a number of communication events.

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~~35.~~ (original) A method of claim ~~7~~¹, further comprising the step of calculating a communication intensity based on both a number of communication events and their temporal characteristics.

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~~36.~~ (original) A method of claim ~~7~~¹, further comprising the step of calculating a communication intensity based on an analysis of a content of a communication event.

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~~37.~~ (original) A method of claim ~~7~~⁴, further comprising the step of modifying the query to create one or more sub-queries.

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~~38.~~ (original) A method of claim ~~37~~⁶, further comprising the step of aggregating results from the sub-queries.

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~~39.~~ (original) A method of claim ~~37~~⁶, further comprising the step of excluding results from the sub-queries.

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40. (currently amended) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for optimize information retrieval based on a user's communication relationships, said method steps comprising:

automatically extracting and integrating relationship information for said user from multiple heterogeneous information sources;

automatically building and storing a data structure to represent the relationship information; and

automatically modifying an user's information retrieval query based on the relationship data structure,

wherein said step of building a data structure further comprises the step of tracking communication intensities between each pair of communication entities via each information source; and

integrating the relationship information from the heterogeneous information sources, in response to said tracking step.

³
~~41.~~ (original) A method of claim 2, further comprising the step of prioritizing and filtering a list of name-to-e-mail address mappings to facilitate sending e-mail.